

# THIR UNITED SHAMES OF AMERICA

TO ALL TO WHOM THESE: PRESENTS SHALL COME: Pklahoma Agricultural Experiment Station (PAES)

A DOCCUS, THERE HAS BEEN PRESENTED TO THE

### Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROFECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY SEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLEMISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFICING IT FOR SALE, OR REPRODUCING IT, OR ORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT D BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY ESCALD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE CENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321

WHEAT, COMMON

'Guymon'

In Costimonn Mucrost, I have hereunto set my hand and caused the seal of the Plant Institute Frotection Office to be affixed at the City of Washington, D.C. this twenty-fifth day of January, in the year two thousand and seven.

Demze

Commissioner
Plant Variety Protection Office
Action has INI 1:

Agriculture

### U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY - BI AND VAPIETY PROTECTION OFFICE

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

AGRICULTURAL MARKETING SERVICE SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE		the Paperwork Reduction Act (PRA) of 1995.				
APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE (Instructions and information collection burden statement on reverse)			Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).			
Oklahoma Agricultural Experiment Station (OAES)				2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME  OK00618W  3. VARIETY NAME  Guymon		
4. ADDRESS (Street and No., or R.F.D. No., City,	State, and ZIP Co	de, and Country)	5.	TELEPHONE (include area code)	FOR OFFICIAL USE ONLY	
Oklahoma State University			(40	05) 744-5398	PVPO NUMBER	
139 Ag Hall			6.	6. FAX (include area code) 200600257		
Stillwater, Ok 74078				05) 744-5269	<u> </u>	
•			`		FILING DATE	
7. IF THE OWNER NAMED IS NOT A "PERSON", ORGANIZATION (corporation, partnership, assor Public University	ciation, etc.)	8. IF INCORPORATED, GIVE STATE OF INCORPORATION	1	DATE OF INCORPORATION	August 2, 2006	
10. NAME AND ADDRESS OF OWNER REPRESE	NTATIVE(S) TO	SERVE IN THIS APPLICATION. (Firs	st persor	n listed will receive all papers)	F FILING AND EXAMINATION FEES:	
Dr. Clarence Watson Assoc, DirectorOAES	•				<b>₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽ ₽</b>	
Oklahoma State University					R DATE BOOK 2006	
139 Ag Hall					c CERTIFICATION FEE:	
Stillwater, OK 74078					l • l	
					D DATE 1214 MG	
11. TELEPHONE (Include area code)	12. FAX (Includ	de area code)		13. E-MAIL	1, 100	
(405) 744-5398	(405) 744-5			c.watson@okstate.edu		
14, CROP KIND (Common Name)	16. FAMILY N.	AME (Botanical)		18. DOES THE VARIETY CONTAIN ANY TRANSGENES? (OPTIONAL)		
Hard White Winter Wheat	Poaceae			YES INO  IF SO, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE		
15. GENUS AND SPECIES NAME OF CROP		RIETY A FIRST GENERATION HYBR	RID?		DEREGULATE THE GENETICALLY MODIFIED PLANT FOR	
Triticum aestivum	☐ YES			COMMERICALIZATION.		
19. CHECK APPROPRIATE BOX FOR EACH ATTA (Follow instructions on reverse)		ITTED		OF CERTIFIED SEED? (See	/ THAT SEED OF THIS VARIETY BE SOLD AS A CLASS Section 83(a) of the Plant Variety Protection Act)	
a. Exhibit A. Origin and Breeding History	of the Vanety				lems 21 and 22 below) INO (If "no", go to item 23)  THAT SEED OF THIS VARIETY BE LIMITED AS TO	
b. Exhibit B. Statement of Distinctness				NUMBER OF CLASSES?		
c. Shibit C. Objective Description of Vari	•			✓ YES ☐ NO		
d. Exhibit D. Additional Description of the					☑ FOUNDATION ☑ REGISTERED ☒ CERTIFIED  THAT SEED OF THIS VARIETY BE LIMITED AS TO	
e. Z Exhibit E. Statement of the Basis of the				NUMBER OF GENERATIONS		
f. Voucher Sample (2,500 viable untreate verification that tissue culture will be de repository)				YES 7 NO	ER 1,2,3, etc. FOR EACH CLASS.	
g. Filing and Examination Fee (\$3,652), m		reasurer of the United		V SOUNDATION V OF	OUTEDED V OFFICE	
States" (Mail to the Plant Variety Protec	tion Office)	77,			GISTERED LX CERTIFIED ressary, please use the space indicated on the reverse.)	
23. HAS THE VARIETY (INCLUDING ANY HARVES FROM THIS VARIETY BEEN SOLD, DISPOSED OTHER COUNTRIES?	STED MATERIAL) D OF, TRANSFER	OR A HYBRID PRODUCED RED, OR USED IN THE U.S. OR		24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)?		
YES NO			YES NO			
IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)				IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)		
25. The owners declare that a viable sample of basi a tuber propagated variety a tissue culture will b	ic seed of the vari e deposited in a p	ety has been furnished with application but it is not applicated the property and maintained for the state of	on and v	vill be replenished upon request in action of the certificate.	cordance with such regulations as may be applicable, or for	
The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.						
Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.						
SIGNATURE OF OWNER			SIGNATURE OF OWNER			
NAME (Please print or type)			NAME	(Please print or type)		
Dr. Clarence Watson			netha (			
CAPACITY OR TITLE	DATE	/ /	CAPAC	ITY OR TITLE	DATE	
Assoc. DirectorOAES 7/13/06 Assoc			Asso	c. DirectorOAES		

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), ALL of the following items must be received in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to reproduce the variety, or for tuber reproduced varieties verification that a viable (in the sense that it will reproduce an entire plant) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$3,652 (\$432 filling fee and \$3,220 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfilled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. DO NOT use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

**Plant Variety Protection Office** Telephone: (301) 504-5518 FAX: (301) 504-5291

\$4382°0

Homepage: http://www.ams.usda.gov/science/pvpo/pvpindex.htm

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and provide evidence that name has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, 10301 Baltimore Avenue, Suite 401 NAL Building, Beltsville, MD 20705. Telephone: (301) 504-5682 http://www.ams.usda.gov/lsg/seed.htm.

#### ITEM

- 19a. Give:
- (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
- (2) the details of subsequent stages of selection and multiplication;
- (3) evidence of uniformity and stability; and
- (4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 19b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
  - (1) identify these varieties and state all differences objectively;
  - (2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
  - (3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 19c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 19d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 19e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
- 20. If "Yes" is specified (seed of this variety be sold by variety name only, as a class of certified seed), the applicant MAY NOT reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See Regulations and Rules of Practice, Section 97.103).
- See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
- 24. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.
- 22. CONTINUED FROM FRONT (Please provide a statement as to the limitation and sequence of generations that may be certified.)
- 23. CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)

September 2, 2005--Foundation seed sold for increase purposes by the Oklahoma Foundation Seed Service

24. CONTINUED FROM FRONT (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. The fees for filling a change of address; owner's representative; ownership or assignment; or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 1.4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, political beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

#### **GUYMON—A HWW FOR OKLAHOMA AND THE GREAT PLAINS**

### Origination and Breeding Procedure

Guymon was experimentally named and tested as OK00618W, which traces to a single  $F_{2:3}$  head row derived from the cross OK95G701/WI89-163W. OK95G701 was derived from the cross Rio Blanco/TAM 200 and was eventually named Intrada. W189-163W was selected from the cross N84-1104/Abilene. It was an AgriPro-Coker experimental line that was eventually named Platte. Therefore, the cross of Guymon is Intrada/Platte.

The F<sub>1</sub> plant generation was grown at Stillwater in 1996 and harvested in bulk. The F<sub>2</sub> generation was grown in the field in 1997 and single heads were harvested. The head-rows were selected for late first-hollow-stem stage, uniformity of phenotype at harvest maturity, spike density, spike size, plump kernels, and light and consistent kernel color. The F<sub>4</sub> was evaluated in the 1999 Dual-Purpose Observation Nursery (DPON), which was managed as a forage-plus-grain system at Stillwater and a grain-only system at Lahoma. Guymon was selected from this nursery on the basis of later dormancy release, forage accumulation, forage regrowth ratings, growth habit, heading date, test weight, protein level, and kernel hardness.

From 2000 through 2004, Guymon was evaluated in the following replicated yield trials, representing 36 site-years in Oklahoma:

Replicated Yield Trials 1 (RYT1, Western OK)	2000
Replicated Yield Trials 2 (RYT2, Central OK)	2001
Oklahoma Elite Nursery 1 (OET1)	2002
Oklahoma Elite Nursery 2 (OET2), 2 yr	2003, 2004
Southern Regional Performance Nursery (SRPN)	2004, 2005
Oklahoma Wheat Variety Trials (WVT)	2004, 2005

Further testing was provided in the USDA-ARS Regional Germplasm Observation Nursery (RGON, entry 161) during 2002-2003. The SRPN included an additional 21 sites outside of Oklahoma. End-use quality was externally examined by the USDA-ARS Hard Winter Wheat Quality Laboratory in Manhattan, KS and by ConAgra, Inc. in Omaha, NE in 2004. Guymon was entered in the 2004 Hard Winter Wheat Milling and Baking Evaluation Program sponsored by the Wheat Quality Council.

Breeder-seed multiplication occurred sequentially in two stages during 2003 and 2004. Breeder seed from the 2003 harvest was passed through a high-speed, electronic, single-kernel sorter to remove genetically and phenotypically red kernels (Engineering Research Unit, USDA-ARS-GMPRC). Plants produced from these seed are not phenotypically distinguishable from the variety, and they occur naturally in the variety and are considered variants of the variety. The final proportion of red kernels based on the NaOH-bleach test was <0.2%. The procedure used to perform this test was published by Ram et al. (Cereal Chemistry, 2002, 79:230-237). This source of breeder seed was used to plant a much larger increase in 2004 at Goodwell, OK, in addition to a small breeder-seed increase at Stillwater. The seed increase from Goodwell was used for foundation seed production in the fall of 2004. The NaOH-bleach test has been used in subsequent generations to confirm the proportion of red kernels at <0.2%. As of the 2006 crop year, Guymon is an  $F_2$ -derived line in the  $F_{11}$  generation.

Guymon was officially released by the Oklahoma Agricultural Experiment Station and the USDAVARS in 2005. It has been observed to be uniform and stable for the past three generations (2004-2006).

#### Exhibit B Statement of Distinctness

#### Most Similar Varieties

Guymon most closely resembles the HW wheat cultivar, Intrada, which is one of the two parents used to produce Guymon. Resemblance is based on kernel size and color, juvenile plant growth habit and winter dormancy release pattern (relatively early compared with contemporary HRW and HW cultivars), test weight patterns, adult-plant height, and resistance to wheat soilborne mosaic virus and susceptibility to current races of stripe rust.

Distinctness of Guymon from Intrada can be drawn in three key areas: 1) percentage of kernel color (red) variants (true variants, not off-types), 2) simple-sequence-repeat (SSR) DNA fragment length at key loci, and 3) grain-yielding capacity in high-yielding environments.

### Supportive Data to Declare Distinctness

#### Kernel color

Breeder seed of Guymon contains 0.2% kernels which stain dark when subjected to the NaOH-stain test published by Ram et al. (Development of standard procedures for a simple, rapid test to determine wheat color class. 2002. Cereal Chem. 79:230-237). This test simplifies detection of brancoat color detection by removing subjectivity inherent in visually classifying untreated individual kernels. At the time of its release in 2000, breeder seed of Intrada was known to contain 1.4% kernels that stain dark by the NaOH-stain test. With this test, red wheat typically turns a dark red color (RHS 165A), whereas white wheat turns pale yellow (RHS 9D).

### 2. DNA polymorphisms

Break at Senterbing a serve

From a series of 200 primers used to characterize SSR loci across the three wheat genomes, 34 primers detected obvious polymorphism between Guymon and Intrada (data provided by G-H. Bai, USDA-ARS Genotyping Laboratory, Manhattan, KS; Table 1). Of those 34, six may be considered codominant markers, i.e., those primers produced a band in each cultivar differing in fragment length of the indicated size in the table. These markers would provide the most effective diagnostic tool in distinguishing Guymon vs. Intrada based on DNA sequence data. Data for two primers, CFA2129 and GWM0588, were entered twice in Table 1, because each primer amplified two bands in one of the two varieties. All other primers listed amplified one band in at least one of the two varieties.

### 3. Grain-yielding capacity

Guymon has higher grain yield capacity than Intrada when measured in high-yielding environments free of stripe rust (caused by *Puccinia striiformis* Westend) infection. Paired comparisons of Guymon versus Intrada were extracted from four breeding nurseries in 2003 and 2004 (Table 2). One pair of nurseries resided in the High Plains site of Goodwell, OK, located in the center of the adaptation range for both Intrada and Guymon. The other pair of nurseries was conducted at Lahoma, OK in north central Oklahoma, not considered to be the primary region of adaptation for these varieties, but where yield expression was relatively high and not biased by reactions to stripe rust. Each nursery contained 30 (2003) or 40 (2004) entries, including Guymon and Intrada. An analysis of variance was conducted within each trial, from which the experimental error variance (estimated by the block x entry mean square) was estimated to compute a two-tailed LSD value. Comparison of two varieties by the LSD, in this case, is equivalent to an *F*-test based on a single degree-of-freedom (df) contrast (Guymon vs. Intrada).

The paired comparisons revealed a consistent difference (*P*<0.10) in each trial. The grain yield of Guymon exceeded that of Intrada by a mean of 19%. This superior yield capacity for Guymon, compared with other available HW cultivars available in the Oklahoma panhandle, was a principal factor leading to its release.

#### Other Descriptive Information

### Agronomic attributes

Like Intrada, Guymon emerges rapidly when seeded early for fall wheat pasture. As a juvenile plant, Guymon exhibits an erect to semi-erect fall and winter growth habit and a moderately coarse canopy texture. Based on tissues collected in 2006, Guymon arrived at first-hollow-stem (FHS) stage on Julian day 66 in Stillwater, OK, and day 73 at Guymon, OK. These dates were either the same as Intrada (Stillwater) or later than Intrada by 4 d (Guymon, OK). Guymon's FHS stage is considered moderately early compared with contemporary HRW and HW wheat varieties. Contrary to field observations for FHS stage, we have observed Guymon to be extremely late to flower in the greenhouse when conditions would otherwise promote early flowering on the vast majority of contemporary winter wheat varieties.

Guymon reaches the heading stage in Oklahoma 2 d later than Intrada and 3 d later than Ok101. Hence, though its arrival at FHS stage is relatively early, subsequent heading date is relatively late. This gives Guymon the appearance of being "sluggish" in canopy regeneration during the period of grazing termination (usually March 1 in central Oklahoma) to onset of heading. Plant stature is moderately tall, averaging 80 cm in Oklahoma and 2 cm taller than Intrada but equal to Ok101. Unlike Intrada, Guymon has been observed to have good straw strength under conditions of significant or severe lodging. In those environments, and on a scale of 1 (lodging resistant) to 5

(highly susceptible), Guymon has a score of 3.5, whereas Intrada has a score of 4.0 to 4.5, or similar to Jagger, which has moderately weak straw strength.

#### Disease and insect reactions

<u>Disease</u> <u>Reaction</u>

Leaf rust (adult-plant) Resistant (to current local races, May 2006)

Stripe rust (adult plant) Susceptible (effective May 2005)

Stripe rust (seedling)

Susceptible (to current races in Kansas)

Wheat soilborne mosaic
Spindle streak mosaic
Septoria leaf blotch (seedling)
Tan spot (seedling)
Powdery mildew (seedling)
Resistant
Resistant
Intermediate
Susceptible
Susceptible

Insect

Greenbug (biotypes E, I)

Hessian fly (field reaction)

Russian wheat aphid (biotypes 1, 2)

Susceptible

Susceptible

#### Milling and baking quality

Guymon exhibits small kernel size based on several standard attributes of milling quality. From 2002 to 2004 in the Oklahoma panhandle, Guymon averaged 58% for large-kernel fraction, 28.1 mg kernel weight, and 2.26 mm kernel diameter. In comparison, Ok101, which is known for its moderately large kernel size, averaged 80% for large-kernel fraction, 31.8 mg kernel weight, and 2.47 mm kernel diameter. Guymon has above-average protein content, with a mean of 13.1% statewide. Its protein content will shift with the environment, but it is expected to fall between Intrada (lower) and Jagger (higher). Mixograph attributes, indicative of gluten strength, show a peculiar pattern for Guymon. A typical mixogram for Guymon will have relatively high angle of ascent and/or descent (below-average mixograph stability) but with an average to above-average bandwidth at 2 minutes past peak dough development. In addition, SDS-sedimentation volumes of a flour-water strength, which coarsely indicate gluten strength and potential loaf volume, are typically above-average. Hence, Guymon has acceptable, but not exceptionally high, gluten strength.

The following quality profile summarizes the primary attributes of end-use quality for Guymon: high test weight with small kernel size, average straight-grade flour yield with moderately low ash content, moderately high protein with moderate strength in the mixer and short mixing time, average water absorption, above-average loaf volume with acceptable crumb grain and color.

#### Area of adaptation

Guymon will be positioned for dryland and irrigated production in an area west of a line extending from Buffalo to Sweetwater, OK, with its primary area of production limited to the three counties in the Oklahoma panhandle. Extending the target area to the east would significantly increase production risks associated with small kernel size,

pre-harvest sprouting susceptibility, and susceptibility to stripe rust. It is being recommended as a replacement for Intrada.

Cooperating scientists

Identification of Guymon as a candidate cultivar was accomplished through OSU's Wheat Improvement Team, which includes Brett Carver (lead scientist), Bob Hunger, Art Klatt, Dave Porter, Jeff Edwards, Patricia Rayas-Duarte, and Bjorn Martin. Also cooperating in the testing of Guymon were breeders throughout the Great Plains associated with the Hard Winter Wheat Performance Nursery Program. They represent state Agricultural Experiment Stations, the USDA-ARS at Lincoln, NE, Manhattan, KS, and Stillwater, OK, and private companies. Without their cooperation, this release would not have been possible.

The DNA fingerprinting procedure referenced in the original Exhibit B, under Supportive Data to Declare Distinctness, section 2, remains accurate and valid, with the exception of one typographical error. The microsatellite or SSR primer named GWM0588 in the text should be corrected as GWM0558. The procedure used to detect polymorphisms at these SSR loci is widely published, with no confidentiality of any component of the procedure. A microsatellite consensus map was published by Somers et al (Theor. Appl. Genet. 2004. 109:1105-1114).

Band sizes which differentiate Guymon vs. Intrada for various SSR primers are reattached in Table 1 (as attached in the original application). Six codominant markers, i.e., primers which produced a band in each cultivar differing in fragment length, provide the most effective diagnostic tool in distinguishing Guymon from Intrada. Those primers and band lengths are shaded in yellow on the attached table. The Allele Reports produced by GeneMarker v1.51 software are also attached for these six primers. The absolute band size may shift by up to 5 bp for a given allele from run to another, but the difference in band size (between Guymon and Intrada) remain the same. In each report, the primer name appears beside the variety name (prefaced by GWM or WMC). Guymon is identified by its experimental name, OK00618W.

Table 1. Primers which detect polymorphisms at simple-sequence-repeat loci in Intrada and Guymon.

	Band size, bp		
Primer	Intrada	Guymon	
BAR0005	0	312	
BAR0084	0	140	
BAR0164	0	223	
BAR0170	0	185	
CFA2129	0	158	
CFA2129	0	182	
CFA2185	0	212	
CFD0014	140	138	
CFD0116	246	244	
CFD0168	0	255	
GWM0006	216	0	
GWM0095	0	126	
GWM0135	0	167	
GWM0148	0	159	
GWM0292	238	231	
GWM0312	0	242	
GWM0334	0	137	
GWM0369	0	172	
GWM0372	333	305	
GWM0383	0	198	
GWM0558	127	0	
GWM0558	192	196	
WMC0025	0	182	
WMC0044	0	281	
WMC0048	0	141	
WMC0083	0	140	
WMC0125	266	264	
WMC0149	221	242	
WMC0177	196	0	
WMC0278	0	181	
WMC0283	Q	169	
WMC0522	205	218	
WMC0532	193	197	
WMC0634	0	256	
WMC0656	0	187	
WMC0707	224	0	

data provided by G-H. Bai, USDA-ARS, Manhattan, KS

## SoftGenetics Allele Report

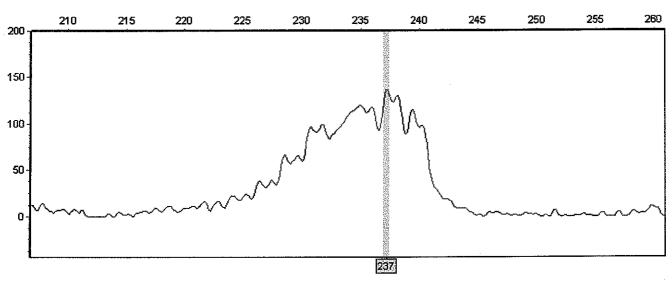
11/9/2006 9:54:12 AM

Page 1

Sample 1:

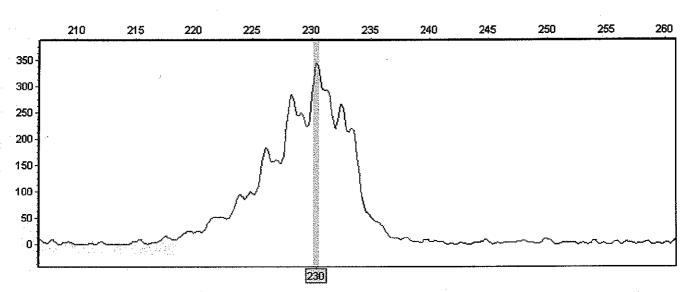
GeneMarker V1.51

Dye: Red - 1 peaks - 04#Intrada~GWM0292PET\_A23\_002\_0045.fsa



Sample 2:

Dye: Red - 1 peaks - 04#OK00618W~GWM0292PET\_G05\_007\_0029.fsa



#### **SoftGenetics**

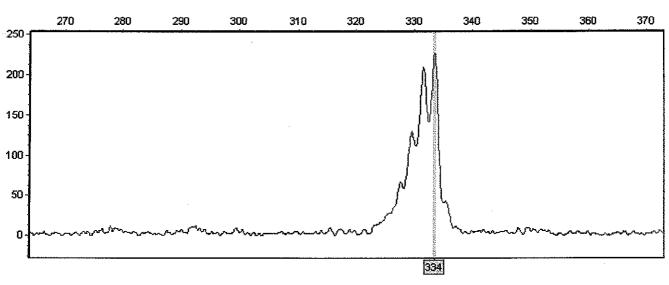
## **Allele Report**

Page 1

GeneMarker V1.51

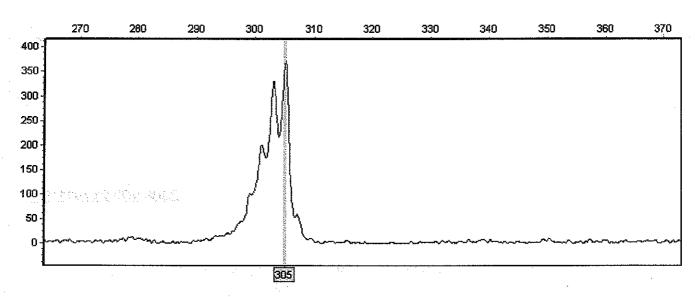
Sample 1:

Dye: Red - 1 peaks - 05#Intrada~GWM0372PET\_B23\_002\_0022.fsa



Sample 2:

Dye: Red - 1 peaks - 05#OK00618W~GWM0372PET\_H05\_007\_0006.fsa



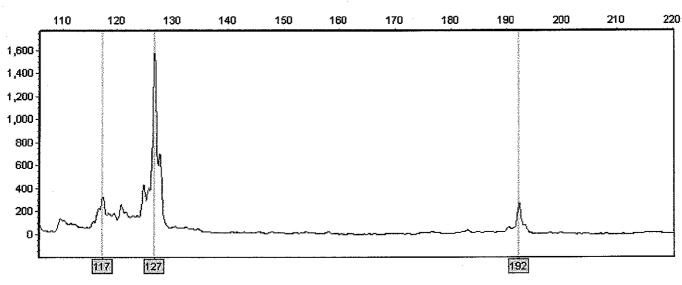
## Allele Report

**SoftGenetics** 

GeneMarker V1.51

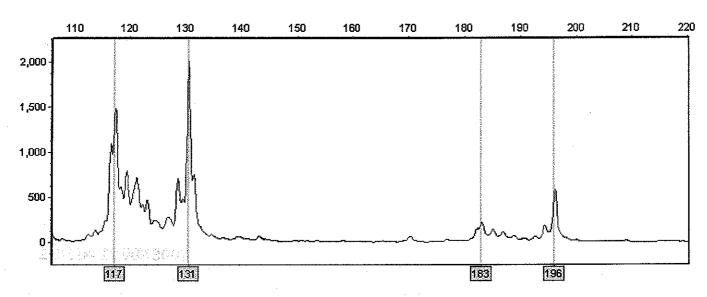
Sample 1:

Dye: Blue - 3 peaks - 07#Intrada~GWM0558FAM\_B24\_002\_0024.fsa



Sample 2:

Dye: Blue - 4 peaks - 07#OK00618W~GWM0558FAM\_H06\_007\_0008.fsa



Page 1

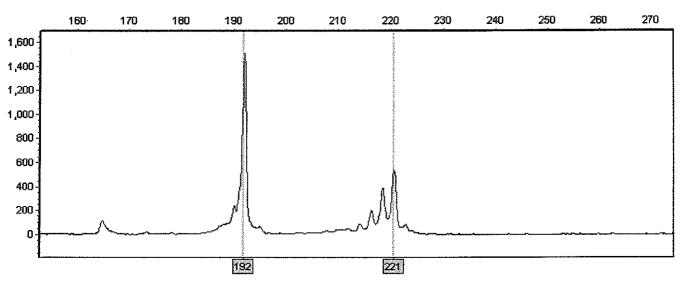
## Allele Report

**SoftGenetics** 

GeneMarker V1.51

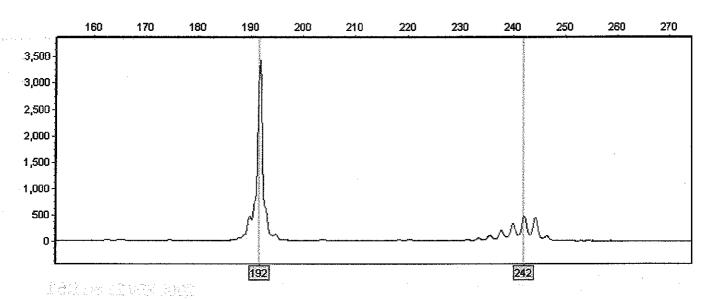
CHICIMAINEI V

**Sample 1:**Dye: Blue - 2 peaks - 10#Intrada~WMC0149FAM\_A24\_002\_0023.fsa



Sample 2:

Dye: Blue - 2 peaks - 10#OK00618W~WMC0149FAM\_G06\_007\_0007.fsa



Page 1

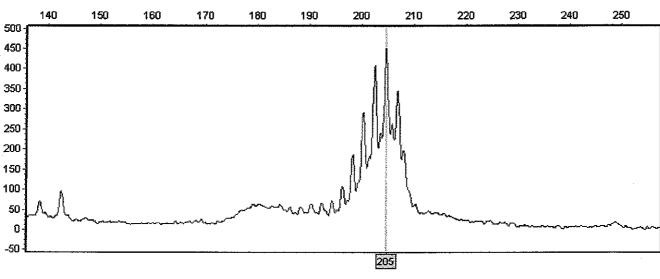
## **Allele Report**

**SoftGenetics** 

GeneMarker V1.51

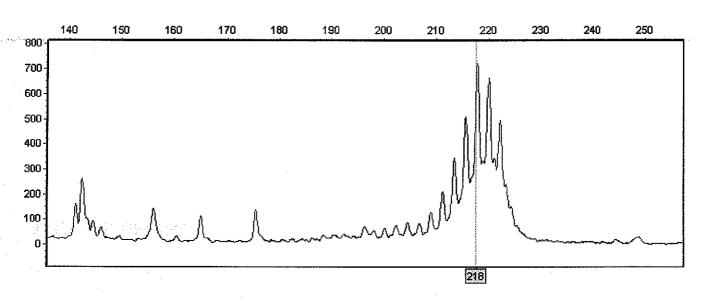
Sample 1:

Dye: Blue - 1 peaks - 11#Intrada~WMC0522FAM\_A23\_002\_0021.fsa



Sample 2:

Dye: Blue - 2 peaks - 11#OK00618W~WMC0522FAM\_G05\_007\_0005.fsa



Page 1

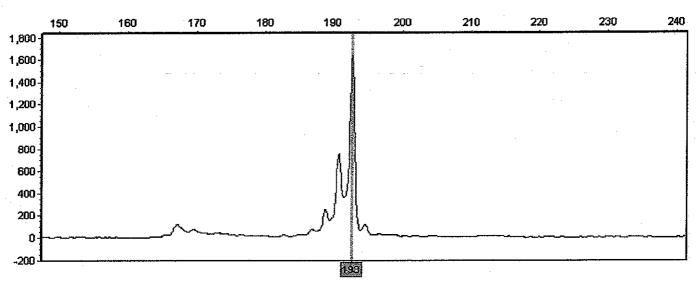
### Allele Report

**SoftGenetics** 

GeneMarker V1.51

Sample 1:

Dye: Blue - 1 peaks - 12#Intrada~WMC0532FAM\_A24\_002\_0023.fsa



Sample 2:

Dye: Blue - 1 peaks - 12#OK00618W~WMC0532FAM\_G06\_007\_0007.fsa

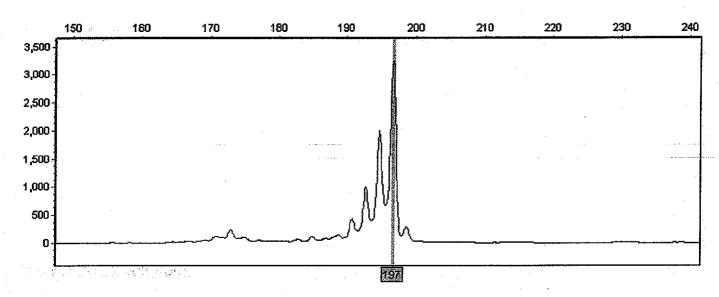


Table 2. Grain yield comparisons (bu/ac) of Guymon vs. Intrada in four high-yielding Oklahoma environments.

200600257

	Goodwell		Lah	oma
	2003	2004	2003	2004
Guymon				
Mean	106	69	78	67
Min	97	57	73	64
Max	119	83	81	70
Intrada				
Mean	94	53	65	57
Min	92	46	63	55
Max	97	64	68	60
LSD	10	11	8	6
% difference	13	30	20	18
			***	

Sowing date	9/25/2002	9/16/2003	10/7/2002	10/15/2003
Harvest date	7/8/2003	6/24/2004	6/18/2003	6/15/2004

All LSD values based on P=0.05, except for Goodwell-2003, which was based on P=0.10 (LSD=13.0, P=0.05)

Three replicates per variety per location-year

LSD determined from complete nursery in each location-year containing 30 or 40 genotypes LSD estimated with error term derived from experimental error variance in each location-year

REPRODUCE LOCALLY. Include form number and date on all reproductions.

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U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE **SCIENCE AND TECHNOLOGY** PLANT VARIETY PROTECTION OFFICE BELTSVILLE, MD 20705

Exhibit C

**OBJECTIVE DESCRIPTION OF VARIETY** 

	vvneat ( <i>i riticum</i> spp.)	
NAME OF APPLICANT (S)	TEMPORARY OR EXPERIMENTAL DESIGNATION	VARIETY NAME
Oklahoma Agricultural Experiment Station	OK00618W	Guymon
ADDRESS (Street and No. or RD No., City, State, Zip Code and Country)		FOR OFFICIAL (SE ONLY
Oklahoma State University 139 Ag Hall Stillwater, OK 74078 Attn: Dr Clarence W	<i>la</i> tson	200600257
	·	
when number is either 99 or less or 9 or less respect	etal character of this variety in the boxes below. Place ively. Data for quantitative plant characters should be barne trial. Royal Horticultural Society or any recognized	pased on a minimum of 100 plants. Comparative data
1. KIND:  1 = Common 2 = Durum 3 = Club 4 = Other (Specify)	2. VERNALIZATION:  2	Specify)
3. COLEOPTILE ANTHOCYANIN:  1 1 = Absent 2 = Present	4. JUVENILE PLANT G 2 1 = Prost	
5. PLANT COLOR: (boot stage)  1 = Yellow-Green 2 = Green 3 = Blue-Green	6. FLAG LEAF: (boot st  2	2 = Recurved isted 2 = Twisted
Same As *  Number of Days Later Than *	Scout 66 2174, NuDakota Jagger Relative to a PVPO-Approved Commercial Variety Grow	rn in the Same Trial
8. ANTHER COLOR:  1 1 = Yellow 2 = Purple		

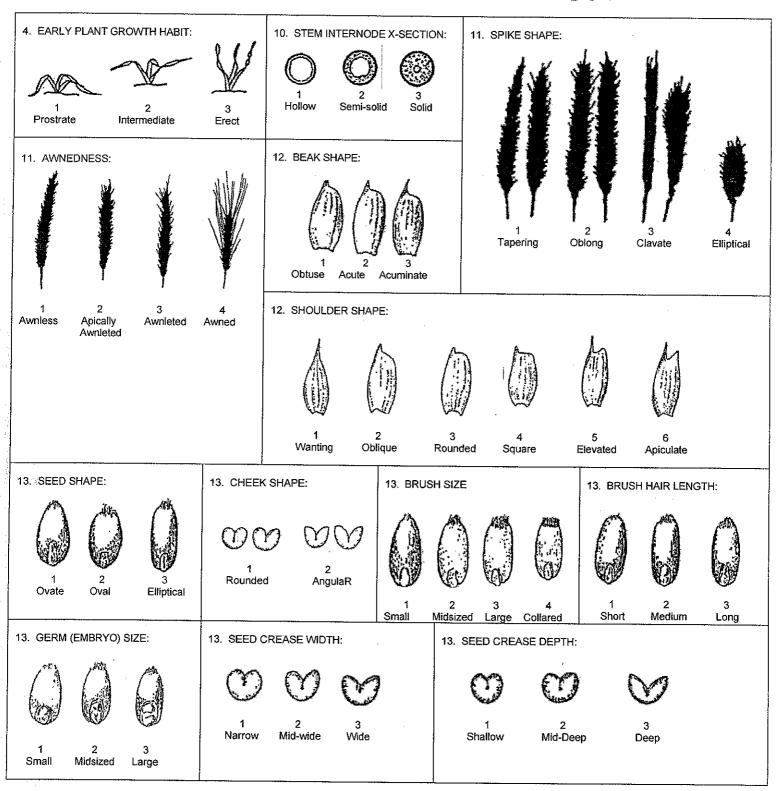
9. PLANT H 0 8 0 0 2 0 8		of head, excluding awns) Intrada 2174 OK Bullet		200600257
10. STEM:	·			·
1	HOCYANIN 1 = Absent 2 = Pres	ent	D.	INTERNODE  1 1 = Hollow 2 = Semi-solid 3 = Solid  5 Number of Nodes
	XY BLOOM 1 = Absent 2 = Pres	ent	E.	PEDUNCLE  1 1 = Erect 2 = Recurved 3 = Semi-erect 3 7 cm Length
[4]	RINESS (last internode 1 = Absent 2 = Pres	•	F. ,	AURICLE  1 Anthocyanin: 1 = Absent 2 = Present  1 Hair: 1 = Absent 2 = Present
11. HEAD: (A	At Maturity)			
A. DEN	SITY		C.	CURVATURE
2 لــٰـا	I = Lax 2 = Middense (Laxidens 3 = Dense	e)		3 1 = Erect 2 = Inclined 3 = Recurved
B. SHAF	PE		D. /	AWNEDNESS
2 : 3	= Tapering 2 = Strap 3 = Clavate 4 = Other (Specify)			1 = Awnless 2 = Apically Awnletted 3 = Awnletted 4 = Awned
12. GLUMES	: (At Maturity)			
A. COLO	OR		E. 6	BEAK WIDTH
2 لــا	= White = Tan = Other (Specify)			1 = Narrow 2 = Medium 3 = Wide
B. SHOU	ULDER		F. (	GLUME LENGTH
3 5	= Wanting 2 = Ob = Rounded 4 = Sq = Elevated 6 = Ap = Other (Specify)	uare		1 = Short (ca. 7mm) 2 = Medium (ca. 8mm) 3 = Long (ca. 9mm)
C. SHOU	JLDER WIDTH		G. \	WIDTH
2	= Narrow = Medium = Wide			1 = Narrow (ca. 3mm) 2 = Medium (ca. 3.5mm) 3 = Long (ca. 4mm)
D. BEAK	<			
3 2	= Obtuse = Acute = Acuminate			

13. S	EED:		
	A. SHAPE	E. COLOR 200600257	
3	1 = Ovate 2 = Oval 3 = Elliptical	1 = White 2 = Amber 3 = Red 4 = Other (Specify)	
E	3. CHEEK	F. TEXTURE	
2	1 = Rounded 2 = Angular	1 1 = Hard 2 = Soft 3 = Other (Specify)	
(	C. BRUSH	G. PHENOL REACTION (See Instructions)	
1	1 = Short 1 = Not Collared 2 = Medium 2 = Collared 3 = Long	1 = Ivory 4 = Dark Brown 2 = Fawn 5 = Black 3 = Light Brown	
	). CREASE	H. SEED WEIGHT	
2	1 = Width 60% or less of Kernel 2 = Width 80% or less of Kernel 3 = Width Nearly as Wide as Kernel	2 8 g/1000 Seed (Whole number only)	
1	1 = Depth 20% or less of Kernel 2 = Depth 35% or less of Kernel 3 = Depth 50% or less of Kernel	I. GERM SIZE  3 1 = Small 2 = Midsize 3 = Large	
14. D	SEASE: PLEASE INDICATE THE SPECIFIC RACE OR STRAI	RAIN TESTED	<del></del>
	(0 = Not Tested 1 = Susceptible	2 = Resistant 3 = Intermediate 4 = Tolerant)	
2	Stem Rust ( <i>Puccinia graminis</i> f. sp. <i>tritici</i> )	2 Leaf Rust ( <i>Puccinia recondita</i> f. sp. <i>tritici</i> )	
. Ī	Stripe Rust ( <i>Puccinia striiformis</i> )	O Loose Smut (Ustilago tritici)	\$
. T	Tan Spot ( <i>Pyrenophora tritici-repentis</i> )	Flag Smut ( <i>Urocystis agropyri</i> )	
. 0	Halo Spot (Selenophoma donacis)	Common Bunt ( <i>Tilletia tritici</i> or T. <i>laevis</i> )	
O	Septoria nodorum (Glume Blotch)	Dwarf Bunt (Tilletia controversa)	
0	Septoria avenae (Speckled Leaf Disease)	1 Karnal Bunt ( <i>Tilletia indica</i> )	
3	Septoria tritici (Speckled Leaf Blotch)	Powdery Mildew (Erysiphe graminis f. sp. tritici)	
1	Scab (Fusarium spp.)	0 "Snow Molds"	
0	"Black Point" (Kernel Smudge)	O Common Root Rot (Fusarium, Cochliobolus and Bipolaris spp.)	
1	Barley Yellow Dwarf Virus (BYDV)	Rhizoctonia Root Rot ( <i>Rhizoctonia solani</i> )	
2	Soilborne Mosaic Virus (SBMV)	Black Chaff (Xanthomonas campestris pv. translucens).	
2	Wheat Yellow (Spindle Streak) Mosaic Virus	Bacterial Leaf Blight (Pseudomonas syringae pv. syringae)	
0	Wheat Streak Mosaic Virus (WSMV)	Other (Specify)	
Γ	Other (Specify)	Other (Specify)	
	Other (Specify)	Other (Specify)	
	Other (Specify)	Other (Specify)	
15. IN	SECT: (0 = Not Tested 1 = Susceptible 2 = Resistant	ant 3 = Intermediate 4 = Tolerant)	
,	PLEASE SPEC	ECIFY BIOTYPE (where needed)	
[1	Hessian Fly (Mayetiola destructor)	Other (Specify)	
0	Stem Sawfly (C <i>ephus</i> spp.)	Other (Specify)	
0	Cereal Leaf Beetle (Oulema melanopa)	Other (Specify)	21

15. INSECT: (continued)	0 = Not Tested	1 = Susceptible	2 = Resistant	3 = Intermediate	4 = Tolerant	
Russian Aphid (D) Greenbug (Schiza Aphids		PLEASE S	Other (	(Where Needed) Specify) Specify) Specify)	2006002	57

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS:

Item 7--Average Number of Days for Ear Emergence = Days after January 1



REPRODUCE LOCALLY. Include form number and edition date on a	Il reproductions. F	ORM APPROVED - OMB No. 0581-0055
U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE  EXHIBIT E  STATEMENT OF THE BASIS OF OWNERSHIP	Application is required in order to detect certificate is to be issued (7 U.S.C. 24 confidential until the certificate is issued)	121). The information is held
1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION	3. VARIETY NAME
1. Tanta of All Elonatio	OR EXPERIMENTAL NUMBER	3. VARIETY NAME
Oklahoma Agricultural Experiment Station (OAES)	OK00618W	Guymon
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country)	5. TELEPHONE (Include area code)	6. FAX (Include area code)
Oklahoma State University 139 Ag Hall	(405) 744-5398	(405) 744-5269
Stillwater, OK 74078	7. PVPO NUMBER 200	600257
8. Does the applicant own all rights to the variety? Mark an "X" in the	ne appropriate block. If no, please expla	in. YES NO
9. Is the applicant (individual or company) a U.S. national or a U.S.	based company? If no, give name of co	ountry. YES NO
10. Is the applicant the original owner? YES	NO If no, please answer one	of the following:
a. If the original rights to variety were owned by individual(s), is	(are) the original owner(s) a U.S. National NO If no, give name of count	
b. If the original rights to variety were owned by a company(ies YES  11. Additional explanation on ownership (Trace ownership from original rights)	NO If no, give name of countr	y
The administration of the control of	mai breeder to current owner. Ose the re	verse тог ехи а зрасе и пеецеој.
PLEASE NOTE:		
Plant variety protection can only be afforded to the owners (not licen	sees) who meet the following criteria:	
If the rights to the variety are owned by the original breeder, that p     national of a country which affords similar protection to nationals of	person must be a U.S. national, national of the U.S. for the same genus and speci	of a UPOV member country, or es.
<ol><li>If the rights to the variety are owned by the company which emplo nationals of a UPOV member country, or owned by nationals of a genus and species.</li></ol>	yed the original breeder(s), the company country which affords similar protection t	must be U.S. based, owned by o nationals of the U.S. for the same
3. If the applicant is an owner who is not the original owner, both the	original owner and the applicant must m	eet one of the above criteria.
The original breeder/owner may be the individual or company who di Act for definitions.	irected the final breeding. See Section 4	1(a)(2) of the Plant Variety Protection
According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, control number. The valid OMB control number for this information collection is 0581-0055, including the time for reviewing the instructions, searching existing data sources, gathering	. The time required to complete this information collec-	tion is estimated to average 0.1 hour per response
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